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ABSTRACT

A study investigated whether 10-grade English students would write more descriptively when their thinking was stimulated through viewing images, or hearing music, or both. Subjects, 49 students in 2 intact classrooms in a middle-class, suburban high school in the Jurupa School District, were randomly assigned to 1 of 4 groups that administered visual stimuli in the form of color slides, auditory stimuli in the form of classical music, both visual and auditory stimuli, or no stimuli. All groups listened to an oral reading of a short story and then wrote a description of the story setting. Experimental groups were administered treatments during the prewriting stage while the control group began prewriting with no auditory or visual stimuli. Essays were scored and compared to results of a pre-treatment measure of writing ability. Results indicated that the use of auditory stimuli, when administered simultaneously with visual stimuli, was effective in improving students' descriptive writing in comparison to the control group. However, results did not show that access to visual stimuli alone or to auditory stimuli alone was any more effective than receiving no sensory stimuli at all during prewriting. In addition, results showed no significant difference between the effects of auditory stimuli used alone and visual stimuli used alone. (Two tables of data are included; 30 references are attached.) (RS)

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The Effects of Auditory and Visual Stimuli on Tenth Graders' Descriptive Writing

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This research study emanated from a desire to find possible significance in improved writing ability through the use of visual images or auditory stimulus or a combination of the two. A specific interest in connections between musical composition, visual composition (a grouping of pictures, photos or slides which suggests a unified theme), and written composition led the researcher to this study.

Literature Review

Imagery has long been recognized as one of the ways humans think. A resurgence of interest in imagery during the 1960's and 1970's, after it had been largely disregarded during the period when behavioral views dominated the field of psychology, produced a large body of research to support the importance of imagery in the thinking process. Paivio, (1971) supports studies showing a relationship between imagery and verbal processes. He sees imagery and verbal language as alternative coding systems, both capable of concreteness and abstractness, and complementary to each other in their distinct symbolic functions. Eisner (1966) supports this: "Cognitive and visual perception

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need not be in conflict -- they complement each other, reinforcing and enriching learning through both channels."

Purves (1985) suggests that the meaning of a literary work involves images and emotions evoked by the language of the text. The pattern of images and emotions leads to a "central imagic and emotional meaning" that dominates the idiosyncratic images of any given reader and subordinates them to the totality of the pattern.

Therefore, the first idea underpinning the present study is that visual stimuli provide a concrete glimpse of life that the student can match with his or her own verbal account. The visual compositions provide concrete stimuli for the formation of imagery, a holistic means of conceptualizing a theme and a way of eliciting a written paper. Imagery, the mental representation of the picture story after the pictures have been viewed, is recalled more powerfully and more rapidly than words and can provide a means for evoking verbal labels (Paivio, 1971). Haber (1970) showed that capacity for recalling visual images was virtually unlimited and suggested that linguistic recall might greatly improve if techniques could be found to attach words to visual images. A common grammar appears to underlie both verbal production of sentences and imaginal production of visualized scenes (Bower, 1972). Thus, composing and writing interact as recalled images to provide concrete experiences for sentence construction.

Kosslyn (1980) moved toward developing a theory of the ways images serve as repositories of information in human memory. He sought to establish scientific evidence that imagery is, along with verbal language, a major mode of information processing. Like Paivio, he stressed the interaction of visual and verbal information, verbal/abstract information working in conjunction with depictive information in the image generation process. Gibson (1966) further substantiated the role of imagery in thought in his attempt to establish the senses as perceptual systems.

Researchers' renewed attention to imagery has also focused on the process of reading comprehension. Reading researchers have produced direct evidence linking reading and mental imagery (Levin, 1973, 1981; Pressley, 1977; Sadoski, 1983). Furthermore, researchers in imagery and its role in comprehension have investigated how imagery relates to prior knowledge, to the thinking process, and to recall (Kosslyn, 1983; Paivio, 1983; Peters & Levin, 1986).

Yet current research on imagery, both in general and as it relates to reading, has focused on visual imagery as opposed to the other aspects of mental imagery. Though visual imagery is usually present whenever imagery occurs, mental imagery includes seven sensory modalities - visual, auditory, gustatory, olfactory, tactile, kinesthetic, and organic (Long, et.al., 1989).

With regard to the various aspects of mental imagery, Elliot Eisner has done extensive educational research on aesthetics in relation to language development and cognition. According to Eisner (1966), the role of the arts is "the communication of new concepts, of new patterns of thinking and perceiving, not didactically as in lectures or textbooks, but as an experience that reorients the beholder." The arts provide communication to which the recipient responds in new ways, investing situations and people with aesthetically compelling meaning and significance. Hence, aesthetics is the beginning of language (the formulation and communication of an intellectual content), and as such the basis for a general science of linguistics.

In regard to cognition, Eisner (1976) explains that aesthetic experiences encompass not only responses to the physical attributes of objects or events, but also includes the cognitive act of drawing relationships between ideas and values acquired through prior experiences and the forms and meanings represented in current stimuli. Each of the sensory systems is constructed to pick up unique information about the qualities that constitute the immediate environment; thus, as long as the sensory systems are intact, the individual can learn how to differentiate, to recall, and to manipulate the qualities he encounters. Yet the meaning of an experience is not simply the function of the experience secured through one of the senses, but, rather, of the interaction among the "data" picked up by the several senses (Eisner, 1982).

Further, Eisner (1985) maintains that language is shaped to help us see and feel and, hence, to know as if we were a participant, transported to another time and place. "The literary in literature resides in the aesthetic capacities of language to influence our experiences." The common function of the aesthetic is to modulate form, i.e. moving patterns of sounds, tones, or combinations of lines and colors, so that it can, in turn, modulate our experience. Absence of attention to the aesthetic is an absence of opportunities to cultivate the sensibilities and the consciousness and, hence, develop mental skills.

Furthermore, as children have access to and acquire competence in dealing with the information embedded within different forms of representation, they pick up more and more information. "Information developed out of highly differentiated perceptual systems can then be used as content for a form of representation, often in a form other than that in which the information was initially acquired (Eisner, 1982). The neglect of developing literacy in forms of representation that sharpen the senses ultimately deprives students of the very content they need to adequately use the skills of reading and writing.

Based upon this research on aesthetics in education, the second idea underlying the present study is that auditory stimuli aid the formulation of mental imagery, hence facilitating verbal processes. Some research has been done pertaining to the effects of music as auditory stimuli. Hall (1952) investigated the effect of background music on the reading comprehension of eighth and ninth grade students and found that, within certain

limitations, substantial aid to reading comprehension results from the use of background music. Furthermore, Hall concluded that background music does not necessarily increase the basic abilities of the individual but it does aid him to perform to the full extent of such capabilities.

According to Donlan (1976) who investigated the effect of four types of music on the quantity and quality of high school students' spontaneous writing, spontaneous writing is affected by music as a stimulus. The study revealed that, of the four types (familiar orchestral, unfamiliar orchestral, familiar vocal, and unfamiliar vocal), only unfamiliar vocal music interfered with either the quality or the quantity of student writing.

Combining the two aspects of mental imagery, Schuster and Vincent (1980) studied the effects of music used in conjunction with visual imagery on learning disabled students' learning of new material. Results showed significant gains in both reading and mathematics after one year of treatment.

Ball and Stafford (1986) conducted a study which involved using music and the visual arts as stimuli in the teaching of short story writing. The researchers found that instruction in music and art appreciation, along with the use of music and art as stimuli, resulted in increased quality of twelfth graders' fiction writing.

Finally, building upon a study by Cardarelli (1979), showing that music can increase mental imagery and can help to stimulate student creativity and motivation, Thompson (1981) compared the effectiveness of audio-pictorial music-slide presentations and printed verbal language selections as stimuli for creative thinking at the invention stage of writing. In a study of low verbal eighth grade students results showed greater improvement in students' creative writing when provided audio-pictorial stimuli.

The purpose of the present study was to explore the use of auditory stimulus and visual stimulus as prewriting techniques to improve the quality of descriptive writing. Descriptive writing is not so much a discourse form or genre as it is a particular writing strategy a writer of prose may choose in order to accomplish a larger discourse purpose. Webster defines a description as "discourse intended to give a mental image of something experienced (as a scene, person or sensation)." More specifically, Hollingsworth (1988) defines descriptive writing as "... giving dimensions, colors, surroundings, origins, placement, and other information to help readers get a mental picture of an object, person, or idea, and how it operates."

According to Cooper (1986), description presents a number of special problems to writers, including choice of vantage point for presenting particular details to include. The Kirby-Liner Working Criteria for Good Student Writing (Kirby & Liner, 1988) lists detail as one of ten criteria for quality writing. Details in good writing are "concrete, photographic, selective, and words that put the reader there." Hence, the descriptive

writer must "particularize the experience" for the reader and provide clarity by searching for the right word, the effective verb, or the clarifying phrase that makes what is said more **real**.

In terms of the structure of descriptions, writers must decide how to order and relate the details they wish to include. Stahl (1974), devised a descriptive scheme which he used as a scoring guide for students' writing based on how well they forecast the order of their descriptions (implicit, explicit) and the relation of that forecast to the organization of the paper (consistent, inconsistent), the ways students chose details to include, and the methods of arranging the details (comprehensive, surveying, associative, egocentric, enumerating).

The present study postulated that descriptive writing, as previously defined, is more likely to occur if the writer has access to pictures or auditory stimulix at the development stage of writing. Through audio-visual media, students may acquire new information or incentive to stimulate ideas which, in turn, help create verbal descriptions to express those ideas. The major question to be answered by the study was whether tenth grade English students would write more descriptively when their thinking is stimulated through viewing images, or hearing music, or both.

Research Questions

The present study focused on both imagery and music as a stimulus for generating ideas to write about.

1) Is there a difference between the effect of auditory stimuli, visual stimuli, or a combination of the two, on the descriptive writing abilities of subjects?

2) Does exposure to audio-visual stimuli in the prewriting stages have a more positive effect on descriptive writing quality than only exposure to verbal reading of the text?

Research Design

Visual stimuli in the form of color slides were administered to one experimental group, auditory stimuli in the form of classical music were administered to another experimental group, and both forms of stimuli were administered to the third experimental group. The control group received no stimulus. All groups listened to an oral reading of a short story and were then asked to write a description of the story setting. Experimental groups were administered treatments during the prewriting stage while the control group began prewriting with no auditory or visual stimuli.

Population

The study was conducted in a middle-class, suburban high school in the Jurupa Unified School District. The sample consisted of students in two intact tenth grade English classrooms, both taught by the same teacher and representative of the same population. The sophomore class sample consisted of a total of 55 students. Six students were dropped from the study, however, due to unobtainable pre-treatment writing scores; thus, group membership ranged from 11 students to 14 students per group.

Experimental Procedure

A pre-treatment measure of writing ability was obtained for all students in the sample. This measure is a writing score from the competency exams taken in the spring of the previous year, six months prior to the study. Students were randomly assigned to one of four groups, which were then treated on the same day in two separate classrooms, two groups per room. The visual experimental group and the control group were treated in one classroom, with the visual group facing the front of the room and the control group facing the back of the room. In the other classroom the auditory-visual experimental group faced the front of the room while the auditory experimental group faced the back. Treatments were randomly assigned to each group as follows:

Group 1 -- audio treatment
Group 2 -- audio-visual treatment
Group 3 -- control group
Group 4 -- visual treatment

Description of Treatments

One experimental group received stimulus in the form of visual media consisting of a five and one-half minute thematic slide presentation including eleven slides, shown for 30 seconds each. The slides were suggestive of the mood of the short story. The advantages of using silent sequences of pictures rather than film with accompanying dialogue is that students don't imitate a language source but rather compose their own words and sentences structures. The second experimental group received stimulus in the form of auditory media consisting of a five and one-half minute classical music selection, a portion of Beethoven's Piano Sonata No. 17 in D Minor, "The Tempest", which, to the researcher, also seemed to depict the mood of the short story selection. The third experimental group received stimulus in both the visual and the auditory media forms, consisting of the same materials used with the other two groups, administered simultaneously.

Prior to administration of the experimental treatment, all subjects listened to a pre-taped oral reading of the selected short story, "In the Dark", by Neil Bell, while reading along with their own copy of the text. The story describes the agonizing flight and subsequent death of a wounded mallard drake. The short story selection was chosen because verbs are used to present life-like pictures and action, yet the environment is not actually described. The visual appearance of the mallard is described; however, the appearance and aesthetics of the setting are left for the reader to infer.

Students in each group were then given the same writing assignment, which was written out ahead of time and read to the subjects. They were instructed to describe the setting of the short story for a film studio that wishes to use the selection to produce a movie. The studio has already written the plot, with the characters, the dialogue and the action completed. The problem posed to students was to write a description of the setting for this movie, using as many descriptive details as possible, to aid the producers and the actors in making this movie. In other words, using written description, students were to construct the backdrop for the movie.

Students were then instructed to spend several minutes devoted to prewriting before beginning their actual descriptive essays. They were allowed to use any form of prewriting they preferred, ranging from listing, clustering, looping, cubing, diagramming, outlining or just brainstorming. At this time, during the prewriting phase, experimental groups were administered the appropriate stimuli and the control group engaged in prewriting with no administered stimulus. After six minutes each group was then told to begin writing final drafts. Subjects were allowed 20 minutes to complete their descriptive essays.

Papers were then assigned a code number and distributed to a reader to be scored. A rubric was used to assign essays a score ranging from 1 to 5, based on the following criteria:

> Focus. Topic orients reader to the scene; focus is upon an image; details are clearly related to topic.
>
> Verbs. Expressive; paint a clear picture of the scene; accurate and varied.

Adjectives & Adverbs. Colorful, interesting and precise; add clarity of meaning; varied.

Figures of Speech. Similes and metaphors used effectively to describe the scene.

Appeal to Senses. Details explicitly appeal to several of the five senses.

Statistical Analysis

From the research questions presented, the null hypothesis was generated for the application of statistical analysis:

> There is no difference in quality of descriptive writing between the experimental group which received visual stimuli, the group which received auditory stimuli, the group which received both visual and auditory stimuli, and the control group.

An analysis of covariance design was chosen for the study in order to increase the precision of the measurement of treatment effect, by taking out the effect of a pre-measured variable, writing ability. Thus, the covariate, a pre-measured writing score, is included in the model for increased precision in determining the effect of stimulus treatments on post-treatment essay scores.

The following assumptions were made in testing for differences in scores among treatments:

1) Random assignment of individuals to treatments. Students from intact classrooms were assigned to groups at random and treatments were assigned to groups at random.

2) Within each treatment, essay scores have a linear regression on pre-treatment writing scores.

3) For individuals with the same pre-treatment writing score, in the same treatment, essay scores have a normal distribution.

4) The covariate is measured without error. The covariate is a writing score measured on a standardized competency exam required by the school district, and, therefore, high reliability may be assumed.

Since the purpose of the ANCOVA is to increase the precision of measuring the effect of treatment on essay scores, by taking out the effect of pre-treatment writing ability, the gain in precision depends largely on the size of the correlation between the two variables. There needs to be a significant relationship between the dependent variable and the covariate. Results of a correlation analysis on essay scores and pre-treatment writing scores show R = .326, sufficient correlation to increase precision of measuring treatment effect.

Furthermore, by performing proc charts, it is evident that the variables are normally distributed and that the researcher may assume no probability of non-normality. Table 1 shows that the covariate correlates with the dependent variable with reasonable evenness across groups.

Results

According to Table 1, Group 2 (audio-visual) scored the highest on the essay, implying that the audio-visual treatment produced the best results. However, it is possible that group 2 happened to be better writers than the other three groups initially, and that the treatment actually has no effect on essay scores. The effects of initial

writing ability and the effects of treatment are confounded and may be causing biased results. Therefore, covarying on the pre-treatment writing score takes into account the initial differences between the groups on this measure, and the means of the essay scores are adjusted.

In addition, by covarying on writing ability, there is reduction of error variance. Statistically removing part of the within-variability results in a smaller error term, and hence a more powerful test. The error term on the results of an analysis of variance procedure is E(MSw) = 68.21/45df, compared to the error term on the results of the analysis of covariance which is E(MSw) = 60.23/44df. Hence, a sizable portion of the within-variability is due to differences in initial writing ability. That is, essay scores differ partly because students differ in pre-treatment writing scores.

According to results of the analysis of covariance on the post-treatment essay scores, there is a significant difference in adjusted population means, $F(4,44) = 2.88$, $p < .0335$. Therefore, the null hypothesis is rejected and it is concluded that at least one treatment during the prewriting phase does have a significant effect on students' essay scores.

Remembering that the null hypothesis being tested is that the adjusted population means are equal, Table 2 shows the adjusted means for each treatment group, after covarying on pre-treatment writing scores. There is a significant difference between groups 3 and 2; but there is no significant difference between any other group. The audio-visual treatment group scored significantly higher than the control group ($p < .0445$); however, the audio-visual treatment group did not score significantly better than either the audio treatment group or the visual treatment group.

Discussion of Results

The results of this study demonstrated that the use of auditory stimuli, when administered simultaneously with visual stimuli, is effective in improving students' descriptive writing in comparison to the control group. The present study was intended to show that students will write more descriptively when their thinking is stimulated during the development stage of writing through viewing images, or hearing music, or both. The study partially supports this hypothesis, as scores for students subjected to both auditory and visual media at the same time were significantly higher than scores of the control group.

However, the study did not show that access to visual stimuli alone or to auditory stimuli alone is any more effective than receiving no sensory stimuli at all during prewriting. In addition, the study did not show a significant difference between the effects of auditory stimuli used alone and visual stimuli used alone.

These findings are in keeping with previous research by Schuster and Vincent (1980) that music used in conjunction with visual imagery will increase learning; and by Thompson (1981) that audio-pictorial presentations will improve students' creative writing.

The marginal positive results obtained in this study indicate that further research in this area is warranted. Future studies should attempt to demonstrate other desirable effects of auditory and visual stimuli and examine the differences in effect upon diverse groups. Furthermore, investigation of the superior effect of combinations of types of stimuli over a single form of sensory stimuli is needed.

Limitations

When the dependent variable is achievement in some content area, then one should consider the possibility of at least three covariates: a measure of ability in that specific content area, a measure of general ability (I.Q. measure), and one or two relevant noncognitive measures, e.g. attitude toward education (Stevens, 1992, p.323).

In studies with small or relatively small group sizes, it is particularly imperative to consider the use of two or three covariates to obtain a more sensitive test. One should attempt to reduce the error variance as much as possible to increase power. This would perhaps lead to significance between some of the other groups, and not just between audio visual treatment and the control group. However, according to Stevens (1992, p.333), Huitema (1980, p.161) recommends the number of covariates be determined by the ratio $\frac{C+(J-1)}{N} < .10$. If this is the case, the present study adequately limits the number of covariates: $\frac{1+(4-1)}{49} < .10 = .08 < .10$, and the estimates of the adjusted means are likely stable.

Again, according to Stevens (1992, p.336), some researchers argue against the use of analysis of covariance with intact groups. One needs to consider whether groups that are equal on the covariate would ever exist in the real world. The level of individual writing ability may be an important factor in which treatment was most successful for each individual. In other words, it may not make sense to compare instructional treatments 1, 2, 3 and 4 for students of average writing ability if each treatment has a different effect on the various ability levels.

Table 1. Mean scores, standard deviations and correlations of essay score and covariate for each treatment group.

Treat. Group	Control 3	Visual 4	Audio 1	Audio-Vis 2
n	14	12	11	12
y	2.00	2.16	2.63	3.00
Sy	1.30	1.33	.92	1.27
x	67.64	67.25	65.36	68.66
Sx	7.67	6.28	10.99	11.22
Rxy	.45	.67	.23	.18

Table 2. Adjusted mean scores and standard errors of the least squares means for each treatment group.

Treat. Group	Control 3	Visual 4	Audio 1	Audio-Vis 2
adjusted y	1.98	2.16	2.72	2.93
std.err. LSM	.31	.33	.35	.33

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